

Using Data Work Scheme (Pilot 2008-9)

A suggested work scheme for this Foundation (Level 1) FSMQ is given below. This recommends a total of 60 guided learning hours (eg 2 hours per week for 30 weeks, 4 hours per week for 15 weeks, 5 hours per week for 12 weeks). There is plenty of scope for varying the order and time allocation.

The following techniques should be introduced as soon as possible and used throughout the course:

- using tables to record results
- using spreadsheets to carry out calculations and display results in tables and statistical charts and graphs
- checking calculations using estimates, inverse operations and different methods.

Although the topics are listed separately, it would be beneficial to follow a number of statistical investigations through from the initial collection and organisation of data to an analysis of the situation making use of statistical charts and measures. Where possible these investigations should reflect the students' other areas of work and interests.

Topic Area	Content	Nuffield Resource	Coursework Portfolio Requirements
Collecting and organising data (5 hours)	Collect data (including tally charts). Organise data on paper and spreadsheets (compare different ways of doing this). Express one quantity as a proportion (fraction, decimal, %) of another. Write 2 quantities as a ratio and reduce it to its simplest form Divide a quantity in a given ratio (eg dividing £50 in the ratio 2:3).	Coffee Shop (starter) Table of information about customers at a coffee shop. Use on paper or in spreadsheet form for discussion and practice of statistical techniques.	(Total time approximately 12 hours) Requirement 1 (2 hours) Two tables of data from two different situations, one drawn using a spreadsheet and the other by hand. Include all relevant data and checks to make sure all data is included.
		Ratio Bingo & Matching Cards (skills activity) Activities that give learners practice in simplifying ratios.	
		Fractions, Decimals and % (skills activity) Series of worksheets for practice in converting between fractions, decimals and percentages. Includes Teacher Notes with weblinks to useful internet resources.	
Statistical Charts (8 hours)	Draw pictograms and bar charts by hand. Draw bar charts and pie charts using a spreadsheet. Draw pie charts by hand – include calculating the size of a sector using a fraction of 360° and using 1% represented by 3.6° . Common equivalencies for simple fractions, decimals and percentages ($\frac{1}{2} = 0.5 = 50\%$, $\frac{1}{4} = 0.25 = 25\%$, $\frac{1}{3} = 0.\dot{3} = 33\frac{1}{3}\%$, $\frac{1}{10} = 0.1 = 10\%$, $\frac{1}{5} = 0.2 = 20\%$ & multiples of these)	Draw line graphs in Excel (starter) Activity that shows students how to draw line graphs in Excel.	Requirement 2 (4 hours) Two different types of statistical diagrams and two different statistical measures illustrating data from up to two different situations. (Could use the data from Requirement 1 or taken from another source.) One diagram should be drawn using a spreadsheet, the other by hand. One measure should be calculated using a spreadsheet, the other not. Diagrams should be relevant, clear, accurate and fully labelled. Calculations should be shown in full.
		Draw pie charts in Excel (starter) Activity that shows students how to draw a pie chart in Excel and change its appearance.	
		Pie Charts (starter) Activity that shows students how to draw a pie chart by hand. Also includes practice exercise with real data – this can also be used as follow up to 'Draw pie charts in Excel' activity.	
		Acid Rain (skill activity) Worksheet explains how acid rain is produced and requires students to analyse the data given in the accompanying spreadsheet.	
		Heights and Weights assignment Data set of girls' and boys' heights and weights from which students select data, then calculate statistical measures and draw statistical diagrams.	



Topic Area	Content	Nuffield Resource	Coursework Portfolio Requirements
Statistical Measures (8 hours)	Find sum, mean, mode, median and range of data with and without a calculator. (Include use of the calculator’s memory.) Use a spreadsheet to sort data and find the sum, mean, median, mode and range. Print out spreadsheet formulae.	On Average (skills activity) Examples and exercises on mean, mode and median.	Requirement 6 (1 hour) Print outs showing the results of statistical work and the formulae used. (Could use the data from Requirements 1-3 or taken from another source.)
		Election Results (skills activity) Spreadsheet containing the 2001 and 2005 General Election Results. Select local data for practice in drawing charts, finding % etc.	
		Body Mass Index (assignment) Illustrates how work from GNVQ Intermediate Science may be adapted for Using Data. Involves collecting and illustrating data using a spreadsheet.	
		Football Figures (skills activity) Excel spreadsheet containing 2007-8 data for each premier league club. Teacher Notes suggest uses.	
		Computer Survey (assignment) Students design a questionnaire about computer usage, carry out a survey and analyse the results	
		Pay Survey (assignment) Investigation into how much paid work students do.	
Line Graphs and Proportionality (8 hours)	Recognise when one set of data is proportional to another by considering step changes (approximate for real data). Draw line graphs by hand, scaling axes (for data not necessarily starting at zero). Show a trend by drawing a straight line if appropriate. Using a spreadsheet to draw a scatter diagram to obtain a line graph. Recognise the graph of data that is directly proportional: straight line passing through the origin. Find the gradient of a graph of a situation involving direct proportionality. Find the equation relating two variables that are directly proportional from a graph or information given in words.	Holiday Money (starter) Examples, exercise and experiments including currency exchange and many other topics involving direct proportionality.	Requirement 3 (3 hours) Two different graphs of data pairs representing two different situations and a brief description of each graph. One graph should be drawn using a spreadsheet and the other by hand. One graph must show direct proportion. (Could use the data from Requirement 1 or taken from another source.) Each written description to explain, if relevant, what: <ul style="list-style-type: none"> • intercepts with the axes • gradients indicate about the real situation.
		Line Graphs (skills activity) Examples and exercises on conversion graphs and other linear graphs. Includes use of a spreadsheet.	
		Reaction Rates (skills activity) Drawing and interpreting graphs using data provided from chemical reactions. Requires graphs to be drawn using spreadsheet and by hand.	
		Climate (skills activity) Excel spreadsheet containing sunshine, rainfall and temperature data for England and Wales, Northern Ireland and Scotland for each month in every year from 1961 to 2003.	
		Graphs (skills activity) 12 pairs of cards for students to match. One card in each pair shows a graph and the other gives a description of the real situation that the graph represents. Powerpoint presentation to aid discussion (same graphs with titles & labels).	
		Map Distances (assignment) Compare distances found from a table and map, then plot a scatter graph to find the relationship.	
		Circles (assignment) Students measure circular objects and find p from the gradient of a graph.	
		Melting and Freezing Points (assignment) Illustrates how work from GNVQ Intermediate Science may be adapted for Making sense of data.	



Topic Area	Content	Nuffield Resource	Coursework Portfolio Requirements
Interpreting graphs (5 hours)	Interpret line graphs, making sense of what is happening in the real situation where the graph cuts the axes Make sense in general terms of the gradient of graphs (steep, shallow, horizontal and vertical gradients only, i.e. calculation of gradients not included except for direct proportion)	College Trip (skills activity) Includes a distance-time graph for interpretation.	Requirement 4 (1 hour) Brief descriptions of what two line graphs drawn by someone else tell you about the situations they represent. Each written description to explain, if relevant, what: <ul style="list-style-type: none"> • intercepts with the axes • gradients indicate about the real situation.
		Crushed Calcium Carbonate (skills activity) Data and line graph of a chemical reaction for interpretation.	
		Curves (skills activity) Discussion sheets and exercise on interpreting and sketching line graphs. Focuses on the shape of graphs.	
Interpreting statistical charts (5 hours)	Interpreting pictograms, bar charts and pie charts.	Eclipse (skills activity) Data sheets about eclipses, discussion sheet and exercise involving interpretation of statistical diagrams.	Requirement 5 (1 hour) Brief report interpreting both raw data and at least two statistical diagrams produced by someone else.
		Mineral Water (assignment) Tabulated data and charts about the mineral content of various bottled waters. Students are asked to interpret and analyse this information.	
		Safety on the Roads (skills activity) Graphs and charts for interpretation.	
Timetables (3 hours)	Read and use timetables given in 24 and 12 hour clock Find the length of time of journeys.	Day Out (skills activity) Students plan a day out using local rail timetables.	
Revision (6 hours)	Revise topics and try past papers. Discuss Data Sheet – make up and try questions based on it.	Making Sense of Data Revision Guide	

